Fig. 1A

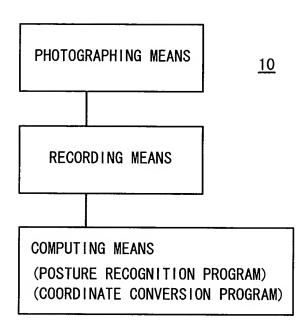


Fig. 1B

11

12-2

15a

10

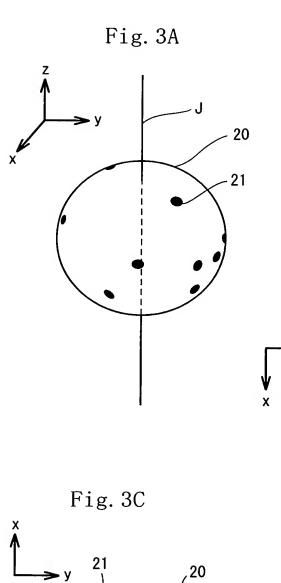
16-2

DISPOSE IMAGINARY SPHERE IN THREE-DIMENSIONAL SPACE (DETERMINE REFERENCE POSTURE AND REFERENCE POSITION) DESIGN VARIABLE (SIX VARIABLES: COORDINATES OF CENTER OF GRAVITY XOYOZO AND ROTATIONAL ANGLES  $\alpha \beta \gamma$ ) OBJECTIVE FUNCTION (GOODNESS-OF-FIT BASED ON TWO-DIMENSIONAL COORDINATES ON FILM SURFACE ONTO WHICH IMAGINARY SPHERE IS PROJECTED) PLACE IMAGINARY SPHERE IN RANDOM POSTURE AND AT RANDOM POSITION IN CERTAIN RANGE OF THREE-DIMENSIONAL SPACE (CORRESPONDING TO INDIVIDUAL IN GENETIC ALGORITHM) GRASP (UTILIZE DIAMETER OF SPHERE) CENTER OF GRAVITY OF IMAGINARY SPHERE DISPOSED IN RANDOM POSTURE AND AT RANDOM POSITION (AFTER SIMULATIOON OF ALTERNATION OF GENERATIONS) AND COORDINATES OF POSITION OF EACH MARK UTILIZE RELATIONSHIP BETWEEN CAMERA FILM SURFACE AND ACTUAL SPACE TO COMPUTE (FIND COORDINATES U, V) TWO-DIMENSIONAL COORDINATE VALUES FROM THREE-DIMENSIONAL COORDINATE VALUES OF ALL MARKS FOR ALL MARKS OF EACH INDIVIDUAL MARK THAT CANNOT BE UTILIZED MARK THAT CAN BE UTILIZED IS MARK ON FRONT SIDE IN GENETIC ALGORITHM IN GENETIC ALGORITHM OR REAR SIDE2 PERFORM OPTIMIZATION COMPUTATION BY USING MARK THAT CAN BE UTILIZED IN GENETIC ALGORITHM (PATTERN MATCHING BETWEEN TWO-DIMENSIONAL BINARIZED SPHERE IMAGE AND PROJECTED IMAGINARY SPHERE) COMPUTE GOODNESS-OF-FIT FOR EACH INDIVIOUAL (USE TWO-DIMENSIONAL COORDINATES) EXECUTE SIMULATION OF ALTERNATION OF GENERATIONS (USE THREE-DIMENSIONAL COORDINATES OF CENTER OF GRAVITY AND ROTATIONAL ANGLE) LEAVE GENERATION HAVING HIGH GOODNESS-OF-FIT TO NEXT GENERATION BY MEANS OF SELECTION, PROLIFERATION, CROSSING OVER, MUTATION · OBTAIN THREE-DIMENSIONAL COORDINATES OF CENTER OF GRAVITY AND ROTATIONAL ANGLE ■ FINISH COMPUTATION IN OPTIMUM CONDITION ALLOW GENERATION HAVING HIGH GOODNESS-OF-FIT OR SOME NUMBERS OF GENERATIONS TO CONTINUE

PERFORM ABOVE COMPUTATIONS AT SOME INTERVALS AND MEASURE SPIN AMOUNT, ROTATIONAL DIRECTION, FLIGHT PATH, FLIGHT SPEED OF SPHERE, BASED ON MOVEMENT AMOUNT OF IMAGINARY SPHERE RELATIVE TO REFERENCE POSTURE AND REFERENCE POSITION THEREOF, DIRECTION, AND ROTATIONAL AMOUNT THEREOF

GRASP POSTURE RELATIVE TO REFERENCE OF SPHERE AND POSITION OF CENTER OF GRAVITY

FOR A CERTAIN TIME PERIOD



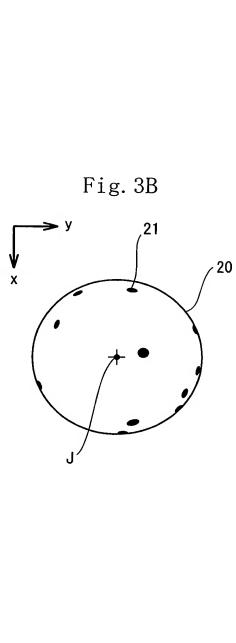


Fig. 4

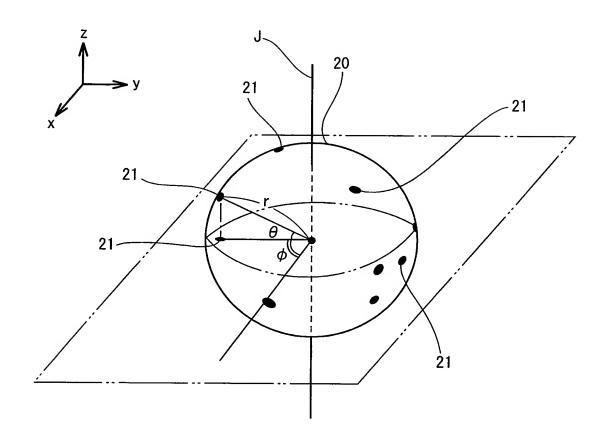
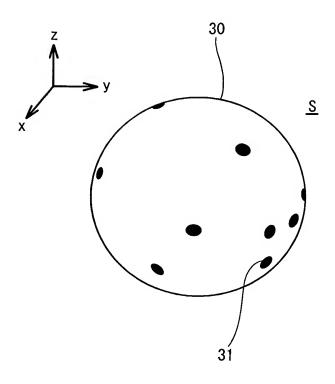


Fig. 5



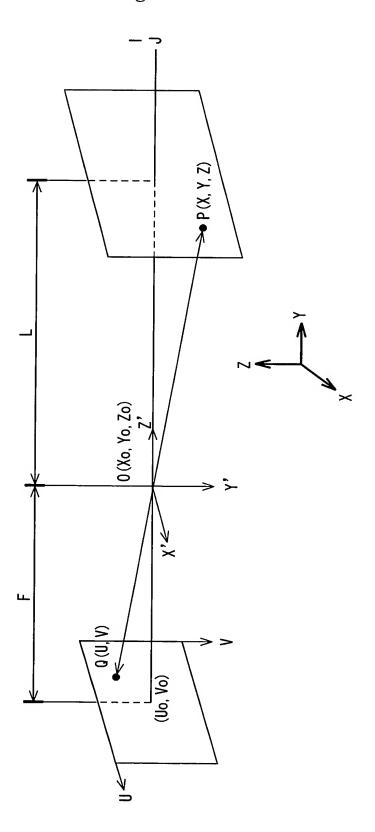


Fig. 7

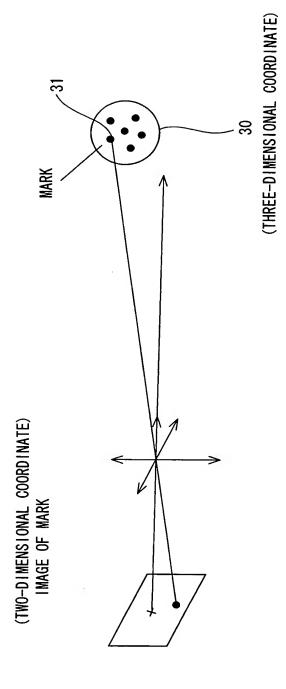


Fig.8

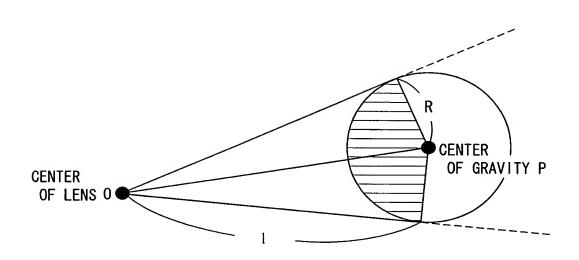


Fig. 9A

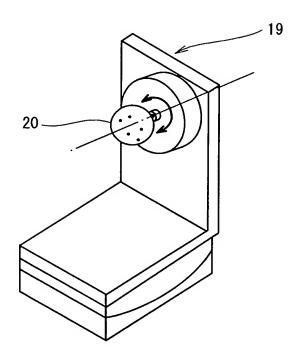


Fig. 9B

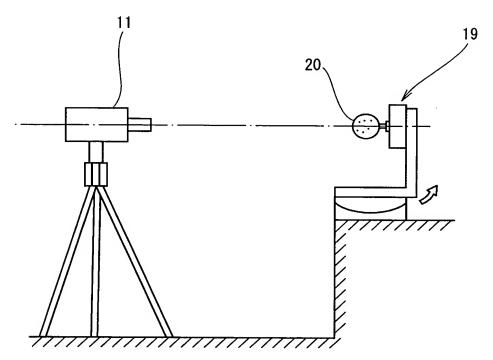


Fig. 10

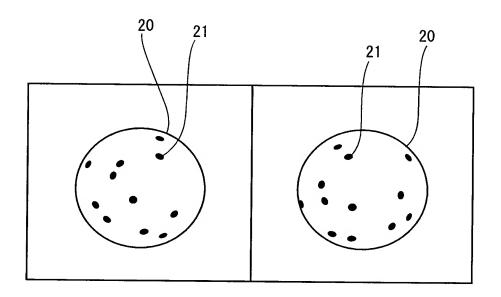


Fig. 11

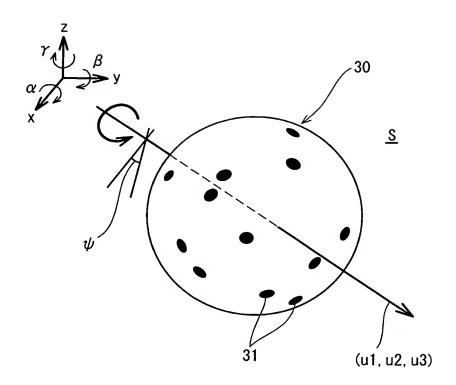
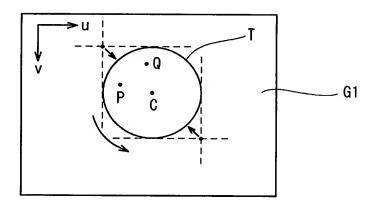
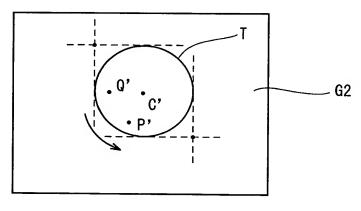


Fig. 12A



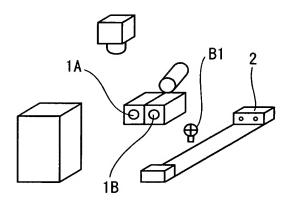
Prior Art

Fig. 12B



Prior Art

Fig. 13A



Prior Art

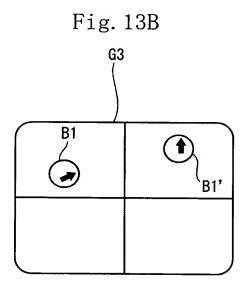
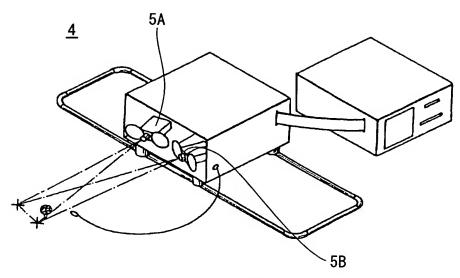


Fig. 14A



Prior Art

Fig. 14B

